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Hamilton Street Railway
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FleetSmart PROFILES

HAMILTON STREET RAILWAY COMPANY

Pioneers in Using Compressed Natural Gas in Transit Buses



Hamilton Street Railway

Company has paved the way for using natural gas to fuel transit buses in many Canadian cities.

For the company, reliable vehicle operation, ease of refuelling, reduced operating costs and fewer exhaust emissions have all contributed to a smooth transition to this abundant transportation fuel.

About the company

Hamilton Street Railway (HSR) provides public transit service to the cities of Hamilton and Stoney Creek and to the towns of Ancaster, Dundas, Flamborough and Glanbrook, in Ontario. The company's service area encompasses 412 square kilometres and a population of approximately 405 000 people. In 1997, HSR transported 20 million passengers.

In 1984, HSR launched a program to convert nine of the company's diesel buses to compressed natural gas (CNG), thus becoming a Canadian pioneer in using CNG as a fuel for urban transit vehicles. With assistance from the Government of Canada, the Government of Ontario, the engine manufacturers and the local gas utility, HSR

service

broke new ground in the design and installation of CNG engines and on-board fuel storage tanks, as well as in the design of an on-site quick-fill refuelling station.

The HSR conversion project clearly demonstrated that CNG fuel can offer both economic and environmental benefits for transit bus operations. Based on its initial experience with the nine converted buses, HSR decided to gradually switch the remainder of the company's fleet to natural gas by purchasing CNG-powered buses as they became commercially available. Today, 58 of HSR's 185 buses operate on CNG and 35 additional CNG-fuelled buses have been ordered.

Cost comparison favours CNG

While ensuring that the goals of reliable vehicle operation and high levels of service were met, the strongest selling point for CNG has been fuel-cost savings.

In 1994, HSR began a comprehensive, two-year comparative analysis of the cost of owning and operating CNG- and diesel-powered buses. The study, which excluded driver costs, involved 15 diesel buses (1989 model year) and 30 CNG buses (1991 and 1992 model years).

To remove any bias that might arise from the different usage rates of the CNG and diesel buses, HSR compared overall vehicle operating costs on a per-kilometre basis. In the case of the CNG buses, the average operating cost was \$0.45 per kilometre for the 1991 vehicles and \$0.35 per kilometre for the 1992 vehicles. The average operating cost for the 1989 diesel buses was \$0.51 per kilometre. In other words, the 1991 CNG buses were 12 percent less expensive to operate than the diesel-powered buses, and the 1992 CNG buses were 32 percent less expensive to operate.

Operational experience has been positive

According to HSR

Director of Engineering

Roy Duncan, a number

of factors sold the transit company's management team on the benefits of CNG fuel.

Not the least of these was that the converted buses have in no way impeded the level or quality of transit service offered by HSR, even though they were assigned to busy and demanding (i.e., more stops per kilometre) downtown routes.

In addition, the company recognized that reduced exhaust emissions from the natural gas buses would be beneficial in downtown areas.

To minimize vehicle downtime for refuelling, HSR installed a quick-fill compressor station that can refuel a CNG bus in under five minutes, compared with about three minutes to refuel a diesel bus.

HSR has also implemented a strict maintenance regime for CNG buses. Major components are inspected and adjusted regularly and a full safety inspection is completed every six months. The CNG buses also require periodic spark plug replacement and the use of a premium quality oil.

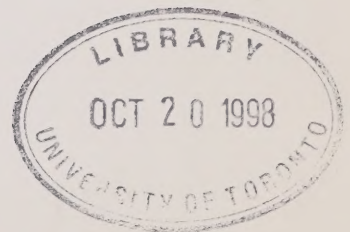
When fuel costs alone were analysed, HSR found that the natural gas buses cost 47 to 53 percent less to operate per kilometre than the diesel vehicles.

In calculating the overall cost of operating the CNG buses, HSR took into account the electricity used to power the natural gas compressor, which adds approximately 13 percent to the cost of the fuel itself. However, the comparison did not include the capital and long-term maintenance costs of the compressor station. The compressor station cost \$1.8 million to install, compared with \$300 000 for a typical diesel refuelling station. Operating and maintenance costs are expected to average about \$40 000 a year over the first five years.

CNG – the fuel of the future

Based on its positive experience, HSR's management team is convinced that natural gas is the fuel of the future for transit buses, delivering lower operating costs, lower exhaust emissions and a positive public image for transit authorities. In fact, the conversion project helped make HSR the first recipient of the Transportation Association of Canada's Environmental Achievement Award in 1995.

payback

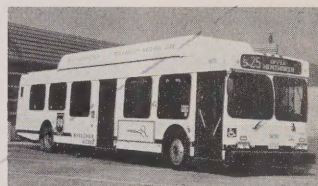


Hamilton Street Railway Operational Cost Comparison (based on 1994 and 1995 data)

Bus type	1989 Diesel	1991 CNG	1992 CNG
No. of buses	15	15	15
Total kilometres (000)	2 625.7	2 079.4	1 939.3
Costs per 1 000 km			
Fuel and electricity	\$234	\$141	\$113
Engine upkeep	62	99	57
Main systems	51	40	27
Auxiliary systems	33	52	42
Other costs	130	121	110
Total cost per 1 000 km (excluding personnel costs)	\$510	\$453	\$349

Note:

HSR has recently released maintenance and fuel costs for these vehicles over the 1996 calendar year. The average cost for the 15 1989 diesel-powered buses was \$0.72 per kilometre. The costs for the 1991 and 1992 CNG-powered buses were \$0.60 and \$0.42 per kilometre respectively. The costs represent savings of 16.7 percent and 41.7 percent over the diesel fleet.



For more information on
fleet energy-saving opportuni-
ties, please write to
FleetSmart
Natural Resources Canada
580 Booth Street, 18th floor
Ottawa, Ontario
K1A 0E4

fax your request to
(613) 952-8169

or e-mail
fleet.smart@nrcan.gc.ca

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FleetSmart

*Providing
New Ideas in
Fleet Energy
Management*



The importance of being FleetSmart

Operating a fleet costs money — and in today's competitive business environment, every dollar counts. If you think the costs of fuelling and maintaining your fleet are beyond your control, think again! You may be missing out on some great opportunities to reduce your company's operating expenses, increase its profitability and improve its competitiveness.

The FleetSmart Program can help. FleetSmart will provide information on spec'ing, fleet maintenance, fuels and driving practices — information you need to implement an energy-management program that will help your fleet's "bottom line."

FleetSmart and the environment

Being FleetSmart affects more than the balance sheet — it also helps the environment. Vehicle use in Canada produces over 20% of carbon dioxide emissions, a major factor in global warming. Through reduced fuel use, fleet operations can make an important contribution to limiting these emissions.

New ideas, new approaches

Whether you operate only a few vehicles or several hundred, you won't want to miss any opportunities to reduce the high costs of fuelling and maintaining your fleet.

The FleetSmart Program has a wealth of information on how to improve your fleet's performance and minimize its operating costs. It will help you assess needs, evaluate options, determine the best approach for your circumstances, and implement and monitor a fuel-efficiency program.

FleetSmart is for fleets of all sizes and makeup. If you are interested in saving money and are open to new ideas and new ways of operating, you'll find that the FleetSmart Program has a lot to offer.

How do I get started?

By contacting FleetSmart and finding out about the energy-saving opportunities available to your fleet.

For more information, please write to

**FleetSmart
Natural Resources
Canada
580 Booth Street
Ottawa, Ontario
K1A 0E4**

or fax your request to
(613) 952-8169.



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Canada

L'importance de la gestion éconergétique des parcs de véhicules

L'exploitation d'un parc de véhicules entraîne des coûts – et dans le contexte commercial compétitif actuel, chaque dollar compte. Si vous croyez n'avoir aucune emprise sur les coûts de carburant et d'entretien de votre parc de véhicules, vous vous trompez ! Vous négligez peut-être de très belles occasions de réduire les coûts d'exploitation de votre entreprise, d'accroître sa rentabilité et d'améliorer sa compétitivité.

Écoflotte peut vous apporter son appui en vous informant sur les spécifications techniques, sur la gestion du parc de véhicules, sur les carburants et sur la conduite. Ce programme vous fournira l'information dont vous avez besoin pour mettre en œuvre un programme de gestion énergétique qui vous aidera à améliorer l'efficacité de votre flotte.

Écoflotte et l'environnement

En plus d'avoir une incidence favorable sur les résultats financiers, la gestion éconergétique d'un parc de véhicules contribue à la protection de l'environnement. Au Canada, les véhicules produisent plus de 20 p.100 des émissions de dioxyde de carbone, l'une des principales causes du réchauffement de la planète. En réduisant la consommation de carburant, les entreprises qui exploitent une flotte peuvent contribuer grandement à limiter ces émissions.

De nouvelles idées, de nouvelles approches

Que votre parc compte un nombre relativement peu élevé de véhicules ou plusieurs centaines, vous ne voudrez pas manquer d'exploiter les nombreuses possibilités de réduire les coûts élevés de carburant et d'entretien.

Le programme Écoflotte est une véritable mine de renseignements. Il vous indiquera comment améliorer le rendement de votre parc de véhicules et réduire les coûts liés à son exploitation. Il vous aidera également à définir vos besoins, à évaluer différentes options, à déterminer la meilleure approche dans votre situation ainsi qu'à mettre en œuvre un programme d'amélioration du rendement du carburant et à en assurer le suivi.

Quelles que soient la taille et la composition de votre parc de véhicules, Écoflotte s'adresse à vous. Si vous souhaitez économiser de l'argent et que vous êtes ouvert aux nouvelles idées et aux nouvelles méthodes d'exploitation, vous constaterez que le programme Écoflotte a beaucoup à vous offrir.

Par où dois-je commencer ?

En communiquant avec le programme Écoflotte pour en savoir plus sur les possibilités éconergétiques dont peut profiter votre parc de véhicules.

Veuillez acheminer votre demande par écrit à :

Écoflotte
Ressources naturelles
Canada
580, rue Booth
Ottawa (Ontario)
K1A 0E4

ou par télécopieur au
(613) 952-8169



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Écoflotte

*De nouvelles idées
pour la gestion
énergétique des
parcs de véhicules*



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